

ABSTRACT

The present invention is a planar waveguide surface emitting laser (PWSEL) and photonic integrated circuit (PIC) technology. The PWVCL can stand alone or it can be integrated with a variety of optical devices, such as  
5 tuners, electro-optic or electro-absorption modulators (EOM or EAM), optical amplifiers (OA), waveguide or traveling wave photo detectors (WPD or TWPD), narrow or broadband filters, active or passive waveguides, and waveguide splitters or couplers to form photonic integrated circuits. Most or all of the components share the same transverse waveguide. A lateral index  
10 step or other suitable technique completes the waveguide so that light is guided in the longitudinal direction. Optical taps (reduced reflectivity mirrors) allow for surface emission of the light.

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